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ON

Education for the Improvement of Agriculture,

BY

JAS. W. ROBERTSON,

*Commissioner of Agriculture and Dairying for the
Dominion of Canada,*

IN THE

ASSEMBLY CHAMBER,

HALIFAX, N. S.,


ON

WEDNESDAY, MARCH 4TH, 1903.

HON. T. R. BLACK, M. P. P., M. E. C.,

Chairman of the Committee on Agriculture,

PRESIDING.



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ADDRESS.

MR. CHAIRMAN AND GENTLEMEN:—

I am very glad to be in Halifax to speak to this gathering on education for the improvement of agriculture in Nova Scotia. I need not congratulate the farmers of this province on the progress of agriculture during recent years. Every one in Nova Scotia and in Canada has reason to be pleased with the great prosperity that has been enjoyed over our whole land, especially in relation to agriculture. We have had years of bountiful harvests, absence of pestilence and enjoyment of peace. These have made for the weal of the people everywhere. We have always been a large country, and the agricultural interests of the country have been growing larger; but it is only recently that we have begun to recognize ourselves as becoming in any sense a great country. It is only still more recently that other people have given us credit for being at the beginnings of greatness as a nation. Largeness and greatness are not identical either in agriculture or in national life. In reading the English papers I have noticed many comments of late, not merely upon Canada's growth but, on Canada's strength and greatness. Our greatness is coming through the advance of our two most important interests, education and agriculture. There is no more important theme or question before the public of Canada to-day or before any body of legislators than education for the improvement of agriculture.

WHAT MAKES FOR GREATNESS.

You are a sturdy people in Nova Scotia. I do not know whether the newness on the first half of the name or the Latin form of its second part has helped you to improve on the qualities of the old Scottish race, but I hope that Nova Scotia may do for Canada in a large measure what the old Scotland has done for humanity at large in respect to educational matters and some other phases of human progress. Here you have, as we have all over Canada, that love of liberty which founded the school house and finds ever worthier nourishment and sustenance there. We talk on occasions of the merits and meanings of our institutions of self-government. Their permanence, their excellence, is assured by the school house. Not only is liberty insured to our people, but it is enjoyed in proportion to our intelligence. Here again we have a fruit of the school house. The administration of justice pure and undefiled is only possible by people who are well educated. Since we cherish most what is most worth while to us as a nation and to us as indi-

viduals, that is, liberty, intelligence and justice, we want to see the boys and girls of those who constitute the bulk of the people and out of whose ranks come leaders in all branches of human affairs, well instructed and well trained.

I have said that our progress is made by advances in education and agriculture. The only sure way of advancing any worthy interest is by the application of intelligent labor—there is no other means. The application of intelligent labor affects the individual and his occupations, it affects his locality, it affects his province, it affects the whole country. Whether a man gathers wealth out of the Klondike, or whether he accumulates it at home, or remains reasonably poor, he makes progress in himself by the application of intelligent labor; and the intelligent quality in his labor depends upon the measure of his education. For educational purposes we have established school houses and colleges; and in passing I may say that there is a heap of foolishness in the mind of ordinary society as to what constitutes an educated person. A good many suppose that the obtaining of a degree from a college, or the having in one's possession a parchment from some such institution, insures the enjoyment of an education. A few of the most helpless men I have ever known were fellows who owned a piece of parchment like that. They never had educational experiences that lead to the ability to do things, to bring things to pass at the right time in the right way. When I say that intelligent labor rests upon education I do not mean to say that it rests upon the number of days a man may have gone to school or the number of days or years he may have attended college. What I mean is that it rests on the experiences of life that lead to ability to think, to know, to do and to manage life and things. Are we giving the young people of this province a fair chance to gain the ability to manage things on the farms? If we have not done so in the past can we not do so now? I think we can.

AGRICULTURAL RESOURCES.

This province has wonderful resources. I will not weary you with statistics. The resources in this province that are inexhaustible are mainly those of agriculture. There are other resources that are easily exhausted, and which when exhausted are not restorable. You have in your minerals a valuable resource, but they are exhaustible and not restorable. There is a difference between a country having a revenue derived from its exhaustible resources and a revenue derived from those which are inexhaustible. You should make sure of continued prosperity in the future by making more of your inexhaustible resources, the greatest of which is agriculture. The agriculture of Nova Scotia is not one of the minor interests in this part of Canada. You are happily condi-

tioned in having many resources in this province. You have your minerals, you have your fisheries, and a variety of other resources outside of agriculture. But while this is true, it is equally true that agriculture counts for more than any other material interest you have in Nova Scotia in every sense. There are over fifty-six thousand occupiers of land in this province. These 56,033 people occupy over five millions (5,080,901) of acres of land in Nova Scotia, of which about one million and a quarter (1,257,468) acres are improved land. These 56,033 occupiers represent an interest of tremendous importance in the amount of capital invested. There is nothing else that comes near it in the province. When the man who takes the census comes around, and he is perhaps the same man who rates the assesment values, he does not get any magnified figures as to the value of the land. The census valuation of the farming land in this province, which you will readily admit is not likely to give results which are beyond the actual facts, the value of the land with buildings, machinery, implements and live stock on the farms of Nova Scotia is over seventy-two and a half millions of dollars (\$72,564,907). The interests of agriculture in Nova Scotia are not a minor or little thing. While the assessed value of the lands, buildings, implements, machinery and live stock, as I have stated, is seventy-two and a half millions of dollars, the annual value of the products of the farms, arrived at in the same way, and therefore not fixed at the retail price, but rather at the valuations upon which the farmer may expect to be taxed, was sixteen million three hundred thousand dollars (\$16,305,555) in 1900. I need not say then that a most important question is how education can best be used to help the men and women who are engaged, and the boys and girls who are growing up to be engaged, in this great industry representing fifty-six thousand heads of families, an investment of capital to the amount of seventy-two and a half millions of dollars, and an annual revenue of sixteen millions three hundred thousand dollars in this province.

HOW AGRICULTURE IS BEING DEVELOPED.

I will not speak in detail on this point or I would be led into giving you a Farmers' Institute speech. But I would like to mention instances of a few ways in which agriculture is being developed elsewhere or is being developed here. It is wise to take note of all the methods and means that have been successful. I think it is foolish for a man to say that he will start from the beginning without first doing that; such a man would proclaim himself a fool in any practical undertaking. The most that people of any generation can do is to improve a little on what their forefathers left them. You have made progress along several lines. Cannot these lines be broadened and lengthened; can new ones be joined to them, while still getting full service from what has been found useful in

the past? There is need for more knowledge among people who farm in regard to managing the natural forces in accordance with the laws that govern all plant life and that govern all animal growth.

Let me make an explanatory parenthesis here. There is a real difference between knowledge and ability. There is a wide difference between soil physics and practical tillage. Every man who understands soil physics can manage land and crops better than if he did not understand the principles. Knowledge will help every man to greater ability, but it does not in itself constitute or confer business ability. A man may know all about the composition of a soil and still be a poor farmer. Therefore, some one may say, "Throw knowledge to the winds." Not so. Every man does better insofar as he knows more and knows better; but a man may know much and not be able to apply it. There is a difference between scientific knowledge and the business application of it. Huxley once said he could not grow as big turnips as Hodge, but he could tell Hodge what would enable him to grow still bigger turnips and to make more money. The agents who become instruments of progress in farming and other affairs, are Men, Knowledge, and Wealth. With the efficiency of these as factors, and with the effectual use of them as means, education has nearly everything to do.

DOES EDUCATION PAY?

Some one asks, "Does education pay?" That is a question put by the citizen who pays the taxes? What does pay? What is worth while? What is life itself and the world worth to anybody? Nothing, except as they provide for and make for richness of experiences. "What shall it profit a man if he gain the whole world and lose his own soul?" You may stick everything which he can desire around a man, and what would they be worth to him unless they helped to enrich his life, his experiences? If you put flowers around a blind man with no sense of smell, of what use or benefit would the flowers be to him? However, the presence of a blind man does not abolish the beauty or fragrance of the flowers in your garden.

The use of faculties trained to the widest range of enjoyment, is what makes for the richest experiences in life. Education itself is a series of experiences leading up to personal intelligence, ability and unselfishness. It is not a remembrance of names, although sometimes memorized knowledge of a second-hand sort has been counted its object. It is a series of experiences from the doing of things, whereby ability is gained to enjoy things and to enjoy life. In every sense education does pay. It is the one thing that enriches the life of individuals and nations. As nations have ideas

and ideals, so they live and lead, and thus are they powerful. What is China with her six hundred millions of people? and she has had bookishness and examinations for centuries. On the other hand, Germany is training the hands as well as the heads of her boys. Her schools and universities are progressive, and the country is making great headway, not only in the arts and sciences, but in all that gives power to dominate in human affairs. Let us rather follow the modern German methods, and not be led any further in the Chinese way of doing things in our common schools.

Education always stands for some sort of power—power to see, power to know, to understand, to do, and therefore power to be. If we are now on similar lines of thinking regarding education, let us consider in what further respects our agriculture may be developed by the application of education.

SOME OF THE DIFFICULTIES.

There are some difficulties in the growing of crops. Pests become more numerous and persistent. There are difficulties in maintaining the fertility of the soil. Land will run out if it is not well managed; but the land of France, under an adequate system of education for agriculture, has been so improved that the average yield of crops per acre is said to have been doubled in less than forty years in that old country. On the other hand there is a possibility of the fertility of our soils—our almost virgin soils—disappearing for want of that intelligent management which alone makes land grow richer and more productive. There are the difficulties of keeping live stock with profit. Many men board too many animals without getting pay for their keep. It takes a competent man to so manage stock as to get a profit out of it. There is need of more knowledge in preparing the products of the farm for market. Last year hundreds of barrels of apples sent to England had far better been dumped into the Bay of Fundy, not merely because there was no return to the shippers, but because such shipments gave a black eye to the good name of the fruit of the province in the London market. And this is not the only province of which that is true. You must know the proper market, and you must know how to prepare your products for the market, otherwise there is a loss instead of a profit.

AS TO CLIMATE.

Climate governs the sort of life that can thrive well in a place from the highest to the lowest. If you take a railway journey from north of Ottawa straight down to Washington you will see the prevalent trees in the northern regions differ from those which become almost tropical plants. If you ascend from the base of a

high mountain in a warm climate you can observe within a few miles of distance conditions similar to those which prevail in different latitudes. In the character of plant life observed, there would be a great similiarity between what was found from the Arctic to the Equator, and what would be found from the sea level to the little stunted, scrubby tree at the extreme limit of growth near the mountain top. It is really the climate that governs the kinds of life in a country, and to a large extent determines the vigor, the activity, the quality of the life which manages the soil and the things that grow in it. We have in Canada climate and soil admirably adapted for sustaining the best forms of life in cereals, in fruits, and in domestic animals.

As an instance of how intelligent cultivation may affect the temperature in the soil, let me mention the result of certain experiments by King on eight farms in Wisconsin. When land was rolled after being seeded the temperature between 1 and 4 o'clock in the afternoon was about 3 degrees higher at points between $1\frac{1}{2}$ to 3 inches in depth than on similar land left unrolled. The explanation of that is in the fact that the rough surface radiates heat, while the smooth surface gives the best chance for absorbing the heat of the sunlight.

A difference of 3 degrees in the temperature of the ground may make all the difference between a good start and a slow start in the growth of the crop. If you could have that simple fact known all over Nova Scotia it would be of great benefit in this province, where the spring growth of crops is usually slow enough at the best. If the boys attending the rural schools would demonstrate the fact by experiments of their own, using a thermometer, do you think any of them would forget the results? That, in itself, would be a valuable part of education for the boy. It would mean a better understanding of natural forces; it would awaken other curiosities, and so the boy would be led out into further knowledge and ability. That is only a bare instance for illustration and not for definition.

SYSTEMATIC SELECTION OF SEED.

Take an instance of the advantage and benefit of using only the best sorts of seed,—not necessarily a variety with a popular name, heralded in catalogue and widely advertised—but a variety proved to be suitable for the locality and proved to be of good quality and productive. Three years ago I was able to begin a movement in Canada for the selection of seeds from special seed grain plots on various farms by boys and girls who entered into competition. Sir William C. Macdonald provided a fund of \$10,000 for prizes. Over six hundred boys and girls participated in the competition by operating seed grain plots. The plan, in brief, was as follows:—

The competitor was required to pick by hand the largest heads from the most vigorous and productive plants, in sufficient quantity to obtain seed from those heads to sow a quarter of an acre, which became the stock seed grain plot. Before the crop of the quarter of an acre was harvested, the competitor again selected by hand the largest heads from the most vigorous plants, in sufficient quantity to sow the quarter of an acre, which became the stock seed grain plot for the following year. 'Out of the large heads selected every year the competitors sent to me at Ottawa one hundred of the largest. A careful record was kept of the number of grains per hundred heads, and also the weight of grains per hundred heads. These boys and girls were not biased in favor of any theory, but the records of their work show that there was a remarkable increase in three years in the number of grains per hundred heads, and also in the weight of the grains per hundred heads. The percentage of increase from the crop of 1900 to that from the crop of 1903, on the average for all Canada, was 18 per cent. of increase in the number of grains per hundred heads of spring wheat, and 28 per cent. of increase in the weight of grains per hundred heads. In oats, the figures were 19 per cent. of increase in the number of grains per hundred heads, and 27 per cent. of increase in the weight of grains per hundred heads. That is a record from several hundred seed grain plots operated by boys and girls. The plots and farms where these seed grain plots were carried on, were visited in many cases, and it was learned that the operators themselves, and neighboring farmers, said that the crops grown on these plots from selected seed were heavier and better, and that the plants were more vigorous, than those produced on the other parts of the farm from the ordinary seed of the same variety without systematic selection. When results so notable as those can be gained by three years of intelligent labor, what do you think is possible in thirty years, when this practice becomes the common one for grain growing on the farms throughout Canada?

THE VALUE OF CLOVER.

The fertility of soil depends not alone on its composition, but also on the condition of the various constituents of plant food contained in it. It is governed also, to a large extent, by the number and activity of the germs or bacteria in the soil.

One of the effective means of improving all soils which have been cropped for many years, is to add humus in some form. Humus may be called the decaying parts of plants. Where cattle are kept a quantity of it may be provided in the manure and litter from the stables. It may be also provided from the residuum of crops, in roots or ungathered leaves. One of the profitable ways of adding it to soil is by growth of clover crops. Clover may be

called an improving crop, or a crop possessing great power to restore fertility to worn-out soils. In the Old Countries it has been used for that purpose from time immemorial. While it contains in itself, and removes from the land where it is grown, a large amount of nitrogen, it still leaves that land richer in nitrogen than it was before. At the famous Rothamstead Experiment Station in England, a part of a field bore a crop of barley and another part of it carried a crop of clover. The barley crop removed nitrogen at the rate of 37.3 pounds per acre, while the clover crop removed nitrogen at the rate of 151.3 pounds per acre. That is to say, the clover crop took away from the land rather more than four times as much nitrogen as the barley crop. The following year barley was sown over the whole field, and the crop grown on the part of the field where clover had been a year before yielded 77 per cent. more than the crop from the part of the field where barley had been grown the previous year. The removal of nitrogen from the land by the clover crop did not impoverish it, but, on the contrary, left it enriched for the following crop of grain.

Clover is a most valuable crop as one in a short rotation. It increases the substances of plant food in the soil for cereals, and makes conditions suitable for the activity of such germs in the soil as prepare other substances for the use of subsequent crops. The use of a clover crop, or some other plant of the same family—one of the legumes—in a rotation, has been demonstrated as the best farm practice. In an experiment extending over thirty-two years at Rothamstead, the records show an increased yield of wheat amounting to 114 per cent. when one crop in the rotation included clover or beans, as compared with the yield from wheat when cereal crops followed cereal crops.

The results on the experimental farms of Canada show that the yield of grains (wheat, oats or barley) after clover is from two to ten bushels per acre more than the yield of grain in the same season from grain after grain. It is not by getting commercial or other material fertilisers and using them on the land, but by fertilising the intelligence of the people through the medium of the common schools, that the greatest improvements in the fertility of the fields are to be made.

HOW PLANT FOOD IS PREPARED.

Another illustration must necessarily be a short one. It will throw a little light on how plants are nourished. I take this body of men as representing the high intelligence of the province. I do that not only because there are representatives of the Legislature present, but because the others here are picked men. A few years ago few knew the meaning of the life of germs in the soil which

make it fit to carry crops. I do not refer to the materials in the soil, but to the life content of the soil. Every animal is nourished by processes which may be considered under three stages at least. Whatever the animal may swallow at first lies outside its body, strictly speaking. Take the earth worm. The soil may have passed through the creature but was not in the creature itself. Our food in the same way goes into a tube and some of it passes through the body without having become part of the body. Before the food that is swallowed is taken up into the juices of the body it must be in a state of solution. Even the starch contained in the bread that we eat must be converted into a soluble state before it goes into the juices of the body. After it gets into the juices of the body it is said to be absorbed, but is not then assimilated into the structure of the body. You may have the worst kind of ill-health from having things absorbed without being assimilated. I once fed a lot of pigs which I took from the same family, and put into different pens. To some of them I gave food that was not adequate nourishment for growth and health; and the pigs in that pen were up and down with nervous prostration in three months. When a lot of stuff, absorbed into the system, is not assimilated, the nervous system has to get rid of it somehow, which is not easy to do. When a tree grows it depends upon similar processes for its support and nutrition. Every thing that goes to the promotion of the growth of the tree must first be reduced to solution, in a liquid or gaseous form. What makes the materials of the food of plants contained in the soil soluble? The activity, the work, of the lowly forms of life which exist there. Every particle of food that a tree or a plant gets out of the soil in a soluble condition has been rendered so by some lowly form of life that made it fit for the roots of the plant to take it in. It is a known fact that an apple orchard in grass land does not thrive; what is the explanation? If you make an examination of the soil you will find that the minute forms of life in the soil of the sod-land, are not more than one twentieth as plentiful as in a field that is cultivated. The processes of cultivation introduce substances and conditions into the ground favorable for these low forms of life to live and multiply. They in turn prepare the food for the trees and other cultivated plants.

They are the cooks of the plant food in the soil. Suppose a boy knew all about that, by instruction, observation, experiment, and training, would he not cultivate the land that he had to manage so as to make it more fertile? He would grow clover at the right time, and would have the proper rotation of crops, and would have his land sweet and in good condition of tilth. If land is sour you put on lime to sweeten it, and usually to sweeten life for the soil microbes that they may labor comfortably. Some years ago I had sent to me from England a formula for the making of compost that was said to be over 250 years old and to come from Somerset-

shire, famous for its dairy products. The formula was to take so many cartloads of dust from the highroad, so many loads of turf, and so many bushels of lime, make them into a heap and turn them over twice or more. When such a compost was put on the land it was said that it made a tremendous difference in the crop. I showed the formula to an eminent chemist, who after examining it said it was worth nothing, that it was like the old superstition as to the virtue of killing pigs in certain phases of the moon. And yet there was the experience of 250 years, as shown by the traditions and records; but he said the formula did not add anything to the land but lime, and that did not count for much because the land might have it already. On the other hand, take a man who has studied the lower forms of life and wants to make a culture of soil bacteria; what does he do? He may take sod and dust—and there is nothing better than road dust—and put in some lime. He will make a culture—what the dairyman would call a “starter.” This old Somersetshire compost was a culture, a starter, promoting the growth of low forms of life that would work like Trojans in preparing soil food for plants. I have seen men with a waggon take three bags of earth from one piece of ground to sow on another piece of ground that would not grow clover; and the following year the clover grew luxuriantly. In taking this earth from the one piece of land to the other the men were seeding the land to which the earth was taken with bacteria. Sometimes if clover will not thrive the first year it will do better the second year; the reason for its not doing so well the first year being that the low forms of life were not abundant enough, or perhaps that the particular germ which lives in clover roots was not present in the soil. If you pull up clover and examine the roots you will find little nodules or tubercles containing low forms of life. These low forms of life are an agency by which the land is made rich by taking in free nitrogen from the atmosphere. An eminent French chemist is reported to have made cultures of soil bacteria which have enriched the land in nitrogen content, apart from the growing of clover. What is the possibility of this thing? I am not speaking of theory but of what is known as fact. Do not the people of Nova Scotia want to have, for their boys and girls, the sort of knowledge that makes for an understanding of life and that makes for the ability to manage life on the farm, life in the soil, in the plants, and in the animals and their products? Do they not need that in this province? They do need it; and they can get it by the proper organization of the educational means at hand.

THE AVAILABLE LABOR.

Let me deal with another of the three resources, viz., labor. May I show you how education and organization have made the laborers of a locality so much more efficient as to increase the prosperity of

the people in a marvellous way? I need not tell you that organization itself does not create anything, but it arranges forces and materials so that you have more power and wider scope. Organize ten men into a fire brigade to fight a fire, and they will do it, where a hundred men disorganized would get in one another's way and be killed. There are many forces for education and progress not yet organized as they might be. There are several schools of agriculture in the different provinces of Canada, and one college of agriculture. These units have been doing their little best for the people, but without any organized relationship to the public or high schools of the country. Then there are the experimental farms, which hardly come into any relation with the rural schools of the country where the children of the farmers get the only school training that is available to most of them. There are Farmers' Institutes, which are doing good work for grown people, but they have had little organic relation with the college and none at all with the common schools. They are working independently, and to some extent with great waste of money, energy and time. If all these forces could be organized under one unit of intelligence, each one would be made far more effective. You do not deprive a man of his power if you organize him into his place. You multiply his power and increase that of others.

ILLUSTRATION OF ORGANIZATION.

Let me give you one illustration. I will take it as between the soil and the sun, and one of the fine food products, cream. If you will come with me in imagination away back a million years or so, you will find what is now fertile soil to be a collection of substances absolutely barren. By-and-by on the collection of particles of rocky material there come tiny little forms of life. Nowadays we call similar ones "micro-organisms." We are in the habit of using big words to hide our ignorance. However, these little things, these organisms, did something definite with something with purpose aforethought. Perhaps that is the meaning of an organ; and perhaps consciousness doing something definite with something is life itself. What is done and what is to be done determines the form of the organ, and perhaps constitutes the character of the life. Take your ear as the organ for hearing. I do not hear only because my ear is the particular shape it has. I think a horse has more acute hearing than I have, and its ear is of different shape. It is, doubtless, adapted to the sort of hearing which a horse must have for protection and comfort. You see the form of an organ is determined by what it does. The thing to be done, the function, determines the form of the organ and of the organism. The trotting horse that can win races is of a different form from the Clydesdale, that moves heavy loads slowly.

Later on, into and out of that dreary lone soil came higher organisms,—mosses, lichens, and such. Their decaying remains, worked over by the lowly forms of life in the soil, prepared a place for larger organisms of a higher order. Then, if you would in imagination jump a long stretch of time, you would find that soil adapted for sustaining the common cereals, clover and Indian corn. They are the higher organisms, using what the lower organisms had made ready for them.

An acre of Indian corn will provide sufficient food material to keep a man eating, and to sustain life for about nine years,—that is, if he has nothing else to do except to chew and digest Indian corn stalks; and if he does not attempt anything better he had better keep to the corn exercise. It is harmless and may prevent mischief. Yet an intelligent man knows that he is fit for something better, something higher. His organism calls for satisfaction in other activities. He might go on using himself to grind corn stalks, but instead he finds another organism in the form of a cow. She is admirably adapted for grinding corn stalks, clover, grains, and turnips. No better occupation or mission is open to her, and so the intelligent man supplements the organization which nature had begun.

By intelligent cultivation he makes sure that the germs in the soil have a good chance to do the work they are fit for; that the clover plant has a good chance to do the work it can best do; that the corn stalk has a fair chance to gather into itself energy and substance from the soil, the air and the sun. He gives the cow a good chance to do the best she can with the coarse materials gathered from his fields. Then he sits down to breakfast and drinks cream. That is a crude and hurriedly presented instance of effective organization.

ORGANIZATION OF COLD STORAGE SERVICE.

Let me give an illustration to show how this has been put into practical operation in Canada. Take the butter trade of Canada, which for export had shrunk to next to nothing less than ten years ago. I need not remind those here of the kind of butter we got on hotel tables from twelve to fifteen years ago. I never get bad butter in Nova Scotia now. Even the ordinary butter of commerce is good. There are other respects in which I think you might improve in dairy matters,—for instance, in the use of descriptive terms. I do not wish this to go much further, but I am compelled to say that I deplore the careless, inexact use of language in this city on dairy subjects. It seems to oppress and depress me to-day. It prevails, it persists in printed language and spoken language. "Porridge and *cream*." The thing called "cream" has just a suggestion of blue-nose cow. I do not want to criticize the wonderful

domestic economy of the hotel, but I would like to correct the language used, and to suggest that another word might be employed which would be in accordance with the fact. However, all that is an aside. The export of butter from Montreal in 1894 was, in round figures, 32,000 packages. There was no organization in respect to the carriage of butter in cold storage. No one could get cold storage unless he had a carload to forward. No one could get cold storage on ship board, and few had it at the creameries. We started the organization of a cold storage scheme in 1895. We arranged with the railway companies to run refrigerator cars once a week for the development of this business. Last summer they were running refrigerator cars weekly from something over forty starting points to Montreal. The small shipper of a few packages could get his butter carried as safely as the shipper who had hundreds in his lot. Cold storage was arranged for at creameries. A small bonus was offered to all who would provide cold storage chambers and maintain them in accordance with regulations. Cold storage was provided on over thirty ocean steamships. The scheme became a national system of cold storage, whereby the product of the small shippers could be carried without deterioration from the starting points in Canada to the destinations in the United Kingdom. One result of the organization of service has been that the export of butter from Montreal, which was 32,055 packages during the season of navigation in 1894, before cold storage, had increased to 525,735 packages in cold storage in 1902. The increase was sixteen fold in eight years.

CO-OPERATIVE DAIRYING IN PRINCE EDWARD ISLAND.

I will give another instance. There are certain places especially adapted for certain industries. The province of Prince Edward Island is especially adapted for butter and cheese factories, but that business was going backward for want of information and education. In the year 1892, with the assistance of money given by the Dominion Government, I started one co-operative cheese factory at New Perth, in Prince Edward Island. The machinery was loaned by the Government. We sent an instructor to organize the business and to arrange the locality into routes for the convenience of those supplying milk. We ran the factory as a Government dairy station. In the autumn of 1892 I took the liberty of exporting to London \$3,600 worth of cheese manufactured at that station, and I can recall the remonstrances of some of the people against risking their cheese in any steamer. I got fault finding letters asking me why I did not sell the cheese at home or in Halifax. I had been in England, and knew something about the English market; and as I had insured the cheese for about 12% more than it was worth I felt easy on the subject. The cheese got to England, and was sold there for the top market price. Some of it indeed sold for sixpence per

cwt. more. I angled for that sixpence and got it. Then, when the Island people knew that they had got sixpence per cwt. more for their cheese than was paid for any other Canadian cheese sold that day in London, it assured them that they could make fine cheese. That was the beginning of the export of cheese,—to the value of \$3,600.

At the taking of the census in 1891 there were four cheese factories in Prince Edward Island, with an output worth \$8,448; when the census of 1901 was taken there were 47 cheese and butter factories, with an output valued at \$566,824. There is the result of organization and education. There has been no increase in the number of acres of land, and there has been but little increase in the number of cows kept. The change has been in the intelligent labor applied to the conditions. The people now run their own factories, and have repaid to the government every dollar that was lent to them. I don't say that you could do this with dairying in Nova Scotia, but it can be done anywhere where the locality is adapted for it. There is no part of agriculture that is not susceptible to the same kind of improvement.

ONTARIO AND QUEBEC.

Take another instance on a larger scale. The province of Ontario is noted for the products of its cheese factories and creameries. It has made great advancement in quality and in quantity as between the two census periods 1891 and 1901. It increased the value of its output of butter and cheese from factories by over seven millions of dollars in ten years; that is to say, the value of the output in 1901 was \$7,136,965 more than the value of the output in 1891. The province of Quebec had not advanced so far in co-operative dairying; but a beginning had been made in organizing its cheese factories and creameries into syndicates. The syndicate was a group of cheese factories employing the services of a travelling instructor.

In 1892 I had the pleasure and honor of helping to start a dairy school for the province of Quebec. I was a director of that school for some years, and the Department of Agriculture at Ottawa authorized me, as Commissioner, to turn in \$3,000 a year of Federal money to help the dairy school at St. Hyacinthe. Of course, I am not a constitutional lawyer. I was not supposed to know, and I confess I do not yet know, that the constitution of the Dominion reserves all questions and matters of industrial or technical education to the Legislatures of the several provinces. I was not well informed with regard to that particular part of the constitution, and I confess I did not care very much. The constitution of a country, like the constitution of a man, may be for the weal of the

country; and the weal of the country need never be subordinated for the sake of literal compliance with the phrases of its written constitution. "The Sabbath was made for man and not man for the Sabbath." So \$3,000 a year of federal money went to the province of Quebec to promote dairying and agriculture by means of education. We did not call it education. That would have been an unconscious slap at the constitution. We began by giving short courses in dairying. Some of the wiseacres said it was foolish to think of imparting any education worthy of the name in a two weeks' course. However, we made it a rule that only students should be admitted who had worked for one year in a cheese factory or butter factory. We had neither the time nor the money to devote to those floating atoms who, in an indefinite way, wanted a college education for dairying. So no one could get the course at St. Hyacinthe unless he had previously had one year of practical experience. These were the very people we wanted to help. These were they who needed help. Then, the provincial authorities went further in organizing the factories in syndicates. No one was allowed to become a syndicate instructor unless he had taken the course, or courses, of instruction at the St. Hyacinthe Dairy School. During the first year (1892-1893) 214 students took the course. The next year 268 students took the course. The third year 328 students took the course; and so on.

Let us come back now for a moment to the census period, and see what the census says about the progress of co-operative dairying in the province of Quebec during that period. I have said that the province of Ontario did very well in the census period in the development of its cheese and butter business. The value of the output of the cheese and butter factories in Ontario in 1901, was \$7,136,965 more than it was ten years before. I am referring now to the growth and not to the total output. In Quebec the output was \$9,343,371 more than it was ten years before. The Quebec people were said to be backward, but they made this advance because of the instruction given in dairying by means of education and organization. I could multiply such cases all over the Dominion, but I have said enough, I think, to show that there is good reason for expecting success in helping agriculture in Nova Scotia by improvements in the organization of education and in its quality as applicable to farm life and work.

THE SCHOOLS OF THE PROVINCE.

Permit me to say a few words about the schools of the province and what they are doing for education. I may as well interject the observation now that any system of education which proposes or aims at helping the people who work on the farms must be a system that will help the common rural schools, because those are the

schools where the future men and women on the farms will get their formal education, during my life time anyway. I listen with interest to many speeches, and I hear men say "why can we not have such education for the farmers as the doctors get; why can we not have a farmers' college?" Let us examine that proposition with regard to its meaning. A doctor does special work for the community. He is not an ordinary member of the community; but is doing work that concerns the permanence, the vitality, the security of life in the community. A few men only are allowed to have charge of that branch of work, and then only when they are properly prepared for it. Otherwise they would bungle things and we would have a calamity. A doctor needs special preparation for special work; and he can gain it only by devoting himself for a long period after having received a college training. The farmer needs special training for his special work, but where can he get it? The few men who are to be doctors have to be spared from other occupations until they are twenty-two or twenty-four years of age. They have to be spared for schools, colleges, hospitals, as otherwise they could not get the sort of education they require. But can the ordinary farm boy be spared from the farm until he is twenty-two to twenty-four years of age? If he could be spared, and I hope in course of time he may be spared, it would be of some advantage to him. But let us look at the other side. In Canada there are about one hundred and forty thousand young men in the rural districts of suitable age to go to college; that is, between the ages of sixteen and twenty. If all these boys were to get the same chance, we would need colleges capable of training over a hundred thousand boys. The agricultural college at Guelph seldom, if ever, had more than a hundred boys in the first year classes. If we undertook to provide a similar education for all the boys of that age on all the farms in Canada, we would need about a thousand colleges as big as the one at Guelph. In this country of ours a certain number of young men are preparing to be doctors, and there are institutions enough that offer them all suitable courses of instruction. Every man who wants to be a doctor can get the education that will fit him to become one. Now, there are in this country of a similar age with the students of medicine, not fewer than a hundred thousand young men who are preparing to be farmers, and if they are all to get the same chance and training enjoyed by the students at the Ontario Agricultural College at Guelph, we would need a thousand colleges to do the work. The ordinary boy on the farm should have, as far as he can get it, the education that will fit him to become a good farmer. If he cannot have a chance of college life, if you cannot take him to college, you must take the knowledge and uplift of the college to him at and in the school to which he does go.

I want to speak for a moment on whether we can help the rural schools in such a way that they will be in a better position to

help the farmers. I think you will see that there is urgent need in this province for a college of agriculture. There is no gainsaying the need of such an institution. But how can it aid the ordinary boy on the farm? I need not discuss before a gathering like this the question of education in the abstract. The province of Nova Scotia stands out preëminent among all the provinces of Canada for the intellectual alertness of its people. I do not hesitate to say that Nova Scotia and Prince Edward Island are preëminent in that respect. The schools in these provinces have done splendid work in that direction. The people of these provinces possess in a preëminent degree minds trained to discriminate between things that differ. But as I have said, there is a good deal of foolishness abroad as to what constitutes education and an educated person. Now, any sort of education worthy of the name makes for the development of intelligence and ability. Not for the development of intelligence alone, but for the development with intelligence of ability as applied to the needs and wants of life. Ability to construe Greek is a good thing in its way and place; but the ability to make the best of one's self while making the most of one's locality is a more desirable sort. Our schools and our educational systems should look towards turning out boys and girls, men and women, who can do things. There has been in our schools a most unhappy separation between the word and the deed. This is always weakening in its results. There has been a separation of the subject matter and methods of the school from the active interests and life of the child.

Will you join me for a moment in considering the characteristics of the entirely uneducated person? That is not the man who cannot speak good English, because many men who are highly educated do not speak it at all. By the uneducated person I mean the person who is ignorant, the person who is helpless, the person who is selfish. I do not care which of these three is taken, they are severally and collectively the stamp of the uneducated. As there is progress out of ignorance into enlightenment, out of helplessness into personal ability, out of selfishness into public spirit, there is so much substantial gain. I think the schools should concern themselves with helping the child to think clearly, to observe clearly, to investigate carefully, to understand fully, and to manage economically. Why should a child in school be deprived of the privilege of studying nature when he lives by natural processes, and the whole human race is sustained by them? Before schools were invented that was the way by which the race made progress. The school came in to supplement the unorganized study of nature and manual training, but by and by it came near depriving the child of what was really essential to him, by absorbing the whole of his time with formal studies from books. Manual training is an essential part of good elementary education. Who are the masters of the earth to-day?

Who became the first masters of the earth? Put man on the same level with the wild beast with the longer tooth and stronger claw, and man is soon nowhere; but let him take a club, a weapon, a tool, and he is master. With fire in the one hand and a weapon or tool in the other, the mastery is asserted and maintained. Man became the tool user; then the user of instruments; and the masters of the globe to-day are those who can best use weapons, tools, machines and instruments. For what is the modern struggle for markets,—for the “open door?” Is it not to give security of employment to the myriads of workmen who use tools and run machines? Of course the commerce which has grown from ability with tools, machines, and instruments, in factories, on farms, and in shops of all sorts, is not the best thing we have even in this period of great trade expansion. Far from it; so let us see that the ability for work and the capacity for happiness are alike conserved and developed by the schools. In our zeal for teaching the 3 R’s, and a whole lot of other things, the training towards and into ability to do things with the hands has been left out of the school house. For that reason I have sometimes been disposed to feel pleased rather than sorry when I heard that a boy had gone fishing instead of sitting passively on a bench at school. You may reform a boy’s manners after he grows up, but it is doubtful whether you can in a similar superficial way reform the structure of his bones or the texture of his nerves and brain. Perhaps the quality of the bones depends upon his getting wholesome milk until he is three years old, and the development of his brain upon his being trained to use his hands and eyes, and senses before he is fourteen. Let the boy be trained by the processes of his schooling to think clearly towards a definite end, believed by himself to be useful and beautiful. Let him be trained into expression of his thought, not only in words, but in deeds, and in things. These will help to form and bring out habits of carefulness and of accuracy—that fine passion for truth, and of self-reliance. These lead a man to seek mastery, not for selfishness, but for service.

SOME STATISTICS.

I have found some very suggestive information in the report of the Superintendent of Education for Nova Scotia for 1901:—

Enrolment, Common School Grades.....	91,114	pupils.
“ High School Grades	7,296	“
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Total	98,410	“
Average attendance daily	53,643	“

Total expenditure :—

Provincial aid	\$254,778
Municipal funds	119,876
Section assessment	470,108
	<hr/>
	\$844,762

You are willing to pay and do pay \$844,762 per annum for the education of 98,410 pupils; and of those there are 53,643 pupils in attendance daily on the average. That is to say on a dollar and cents basis the cost is \$844,762 for the education of 53,643 pupils in attendance daily on the average; and everybody asserts that the education is worth the cost and much more. On the same financial basis the province is losing in round figures \$400,000 yearly by the want of school training, by the comparative ignorance and lack of education of those 25,000 pupils who are not in attendance daily, but who would be in attendance daily if even 80 per cent. of the children on the roll were present. That is a tremendous, an appalling, loss to the province. The consolidation of rural schools and the conveyance of the children in school vans would prevent all that, and bring many other benefits besides those which regular attendance would afford.

CONSOLIDATION OF SCHOOLS.

Some of the essentials for good rural schools are: (1), good teachers with experience; (2), wholesome children; (3), efficient supervision; (4), good buildings; (5), neat and beautiful surroundings; (6), active public interest and adequate support.

If we cannot arrange at once to bring into existence all the desirable conditions for good schools, we should strive to create as many of those conditions as we can, in as many places as we can. There is no witchery or fairy charm in the word or fact of consolidation to put away all the present weakness and ills of small rural schools. However, consolidation will bring opportunities and means for improvement within reach of the teachers, the people and the children. Ever increasing benefits may be found by using those to the fullest extent.

GOOD TEACHERS.

Teaching is a great art. It is the art of living, the art of living and laboring so as to lead young lives out into desire and ability to live usefully, and, therefore, happily. The greatest of all teachers said, "I am come that ye might have life and have it more abundantly."

In addition to scholarship the teacher should be an example of neatness, good manners, good temper and cheerful attitude towards life in general and towards the life of the school house in particular; and should know by experience that observing, investigating, recognizing and understanding real things are forms of mental activity and power superior to the mere remembering of words, names, forms and rules.

New methods of education, such as Nature Study, Manual Training and Domestic Economy, would be made easily possible at consolidated rural schools. The teachers would find great satisfaction and delight in them. As it is the part of the public to provide means for the education of the children, it is more particularly the duty and privilege of the teachers to make the best use of those means. Here, as elsewhere, for the public at large and the teacher in particular, the paths of duty, happiness and progress are in the same direction and run within the same bounds.

Centralization of schools would provide for perhaps fewer teachers, but better teachers of more experience. At the present time there are comparatively few, if any, prize places in the teaching profession in rural schools. The coveted posts are in the towns and cities; they draw the teachers of approved ability from the rural districts. Large central schools in the rural districts would provide what might be called, relatively, "prize places" for teachers who would devote themselves to teaching as a life profession in rural districts. Teachers would stay in the same places far longer in consolidated schools than in one-room schools in the country parts.

When the schools are consolidated we will have one male teacher at the head of every school. Do you know that at the present time we are leaving the children to be educated almost entirely by young girls? and it is pitiful. Take this province, and twenty years ago, taking the province as a whole, there were ten male to every sixteen female teachers. In 1901 there were only ten to every thirty-six; and this province is not as bad in that respect as some others. I believe in the ability and grace and skill of womanhood as profoundly as anyone; but I believe in having a man at the head of most schools to impress the children, particularly the older boys, with the many things that boys need to have imparted to them as part of their school education. But you cannot keep a male teacher at the salaries you are paying male teachers to-day, except in the towns and in the cities. The average salary of the male teachers employed in the rural districts is \$258. That is for a male teacher holding a Grade C license. Do you know that that is \$9 less than it was twenty years ago? I know it costs me twice as much to live to-day as it did twenty years ago. I cannot live in the same

relative place in the community for less than twice as much money as it used to cost me twenty years ago; and yet the salaries paid to your male teachers have gone down. The young men who formerly took up teaching have gone out of the profession into something else. Suppose now that you had consolidated schools. At six or seven hundred dollars a year in the country, with a residence and garden, the position of head of one of these schools would become a post that many young men would be desirous of securing. They would teach for a lifetime; they would gain skill and experience; and you would soon dot the country with schools in which the boys and girls would have a fair chance.

WHOLESOME CHILDREN.

Various elements enter into the factors that make for a good education. Among these are a large enough attendance to form classes of children about equal age and advancement in studies. The gathering of the children into a school where they could be properly graded, and, to a large extent, classified according to stage of advancement, would be a means towards that end. In that respect the town and city schools are in advance of the rural schools at the present time.

By centralization or consolidation, a large number of children could be brought together in one building. Strong classes could be formed, properly graded, and the children classified from time to time as advancement was made. Such classes stimulate every child to do his and her best. One child teaches another, on the whole, perhaps, quite as much as any grown teacher does. In other words, the stimulating, directing and informing power of a teacher is multiplied two, three or even four times to many of the individual pupils through the passing on by pupils to their classmates of the help they have derived direct from the teacher. It is not only the clever and bright pupils who do this. Every child, in some measure, interprets to its fellow child some part or some phase of a lesson. By gathering the children from five or six rural schools into one central graded school, the teaching power of the children of the locality for other children in the locality would be utilized. Each pupil in a class learns much from his fellow pupils. As the bright, quick one, sees in part, others are helped to see; as they reveal their methods of study, other children learn. Children also learn from classes to which they do not belong, as well as from children in the groups of their own degree of advancement.

EFFICIENT SUPERVISION.

Supervision of rural schools by school boards, inspectors and departments of education, must be intelligent, sympathetic and skill-

ful, co-operating with the teachers to bring the schools into touch with the homes and with the occupations of the people. Those who have the power of governing and responsibility of guiding must needs be in close touch with the lives of the people whose children are being educated, and in sympathy with the life which the children themselves will follow when they come to mature years. It is most promising and hopeful that the public school inspectors are leaders and guides in education, rather than official valuers of other teachers' work.

It becomes necessary that members of school boards should have a clearer appreciation of the qualities essential to a good teacher; and of the fact that the best teacher becomes still better by at least two years of experience. School boards, for the sake of saving a few dollars in salary, cannot afford to have the children practiced upon all the time by young teachers, who are gaining experience at the cost of child-time and of the opportunities which to those particular children never come again.

The indifference, ignorance and selfishness of some parents come between their children and the chance of a good education. The united power and influence of departments of education, inspectors, school boards and teachers, must be exerted more energetically and patiently in behalf of those little ones.

GOOD BUILDINGS.

The rural school house is rarely a thing of beauty; it is sometimes a place of discomforts and a hindrance to the natural development of robust bodies and to the growth of mental vigor and activity. Many a school still lacks suitable desks with comfortable seats. In matters of heating, lighting and ventilation, the lonely little school has been left untouched by the improvements which have made town schools models for promoting comfort and health. Everybody admits the high educational value of a well constructed, well arranged, well equipped, school room, with windows and floors shiningly clean, and walls decorated with pictures. "Day by day beautiful, comfortable and clean surroundings will have their ethical influence upon his development until he comes to abhor anything that is not beautiful, well ordered and clean."

NEAT AND BEAUTIFUL SURROUNDINGS.

Pleasant and well-arranged surroundings are silent, potent educational forces. The child naturally tries to put himself into harmony with what surrounds him. That effort, often unconscious to himself, is part of his education. What a charge that sentence brings against the untidy, uncomfortable, unlovely interiors and

exteriors of many school houses in rural districts, and against their fenceless, uncared-for and hardly decent surroundings !

There are over 100,000 school gardens in use in European countries. These beautify the school grounds and are used for educational purposes as well.

Why should not the schoolhouse and school premises be the most beautiful and attractive place in the locality ? If the children are to spend between six and seven hours a day there, should it not be made a place to be proud of, and known to them as worthy of all praise ?

Would it not be a good thing if the bare, neglected, depressing and sometimes hardly decent surroundings of the schoolhouse were improved into gardens, expressing the refined taste and skill of the people of the locality, under the management of their teacher ? If unsightly and repellant premises are not in themselves degrading, they have a tendency to dull the taste and the judgment of young persons as to what should be esteemed. It is of great benefit in early life to have one's surroundings of such a sort as to inculcate and develop a love of flowers, of pictures, and of good books. The school should be a place for supplying those conditions in such a way as to help on the harmonious development of the child's character.

The rural school, as every other school, should be so conducted as to bring about the formation of desirable habits. Among those are regularity, punctuality, obedience, industry and self-control. Children who observed beautiful things, nicely arranged, inside the school and outside the school, would also be more likely to observe graceful speech, good manners and unflagging truthfulness, and to become respectful and reverent towards the beautiful and the good.

PUBLIC INTEREST AND SUPPORT.

It is not to be expected that simple consolidation of schools will create, at once, all the desirable conditions which have been referred to. If the centralizing plan enables communities and school authorities to do better for education than they can do at one-room schools, it is so far a helpful one. In 1902 I visited consolidated rural schools in Iowa and Ohio; and after personal examination and inquiry, am convinced that many valuable advantages can be gained through the system of consolidation as it might be applied in Canada.

As far as could be learned at the places visited, there was almost entire unanimity of opinion among the ratepayers respecting the

marked success and superior advantages of consolidation. While the scheme was brought into effect under vigorous discussion and considerable opposition, the adverse criticism has been disarmed by the results of experience. With few exceptions "the kickers," as they are designated locally, were ratepayers without children, or persons who feared some depreciation in the value of their own property, or, worse still, some increase in the value of the property nearest to the centralized school. Experience has proven the former of these two fears to be groundless.

A PIONEER IN CONSOLIDATION.

Six years ago Gustavus Township, in Ohio, became the pioneer in that part of the United States in the consolidation of rural schools. There were nine school districts in the township, and as many small schools. Then the districts were united into one, and a central school was erected at a cost of \$3,000. It is a frame building, containing four large well-lighted class rooms, a small recitation room and cloak rooms. Instead of nine teachers in little isolated schools, there are now a principal at a salary of \$65 per month, and four assistant teachers at \$32 or \$30 per month, in the united school. Nine nice-looking vans are used to convey the children from and to their homes. These wagons, or school vans, have comfortable seats running lengthwise of the vehicle, waterproof canvas covers and spring gearings. Before consolidation the average attendance at the schools in that township was 125. On the day of my visit it was 143 out of an enrolment of 162. The year before consolidation the cost of maintenance of the nine schools of the township was \$2 900. Four years afterwards the cost of the centralized schools, including the conveying of the children, was \$3,156, being an increase in expenditure by the township on its school system of \$256. However, the average attendance at the central school was so much greater than at the single district schools, that the cost of education was decreased \$1.59 per pupil on the average attendance. Moreover, three years of high school work is carried on in the consolidated school, and the total cost of that is included in the \$3,156.

OTHER TOWNSHIPS.

The people in five adjoining townships have also consolidated their schools. Those of Gustavus, Kinsman and Johnston were selected for special scrutiny as presenting typical phases of the system. The schools of Kinsman and Johnston townships have been consolidated for two years. At Kinsman the enrolment of pupils was 146, and eight school vans were engaged; at Gustavus 162 pupils were on the roll, and nine vans were used; at Johnston 175 pupils attended school, and ten vans were in service.

Although the weather was rainy, and the roads as bad as three inches of snow mixed with mud could make them, the children jumped out of the vans at Kinsman school with dry clothing and dry feet. Little boys and girls of six years came three and four miles in comfort. The teachers said they came regularly in all weathers. Under the small district system in the township of Kinsman, two years before, the enrolment at the schools was 110; under the consolidated system it has risen to 146, without any appreciable difference in the total enumeration of children in the township. The high percentage of young children (6 to 8 years), and the large proportion of older pupils (from 15 to 20 years), were eloquent of the gains in education during the first two and the later years of school life in a rural district.

SCHOOL VANS.

The contracts for conveying children to and from the schools are given to responsible persons. These are under bond to provide comfortable covered wagons, and to comply with the regulations of the school authorities. The vans hold from 15 up to over 25 each. The longest route traversed was about six miles. The vans arrive at the school at from ten to twenty minutes before nine o'clock, the hour at which the forenoon session begins. The afternoon session closes at half-past three o'clock. At Johnston school where the closing exercises were observed, the children were in the vans starting for their homes in less than five minutes afterwards.

At Kinsman the eight vans are engaged at an average cost of \$2.07 per school day; at Gustavus, the nine vans at an average of \$1.25; and at Johnson, the ten vans at an average of \$1.27. The price of the vans was from \$100 to \$135 each. All the vans observed were drawn by two horses each. The drivers who were conversed with said they had not known of any injury to any child. They said the regulations required them to wait for the children at any house for a period not exceeding two minutes; that as a matter of fact, it was rarely necessary to wait one minute, and that a case where the children missed the van or were left from being late was very uncommon. The average attendance at the schools confirmed all that.

THE SCHOOL WORK.

Mr. R. H. Cowley, Inspector of Schools for the County of Carleton, Ont., accompanied me; and through the courtesy of the principals of the three schools we were enabled to obtain some information not hitherto recorded. That included, among other matters, the free expression of the opinions of the pupils themselves on the relative merits of the old and the new. Mr. Cowley summed up these points as follows:

"About five per cent. of the pupils preferred walking to the old school rather than riding in a van to the new school. Almost without exception these were pupils who now have four to six miles of a drive in place of a former walk of one mile or less. At the same time these pupils expressed a decided preference for the work of the consolidated school. The evidence of both pupils and teachers goes to show that riding in the vans is alike comfortable and free from injury to even the youngest children. The increased enrolment of pupils and the very high percentage of regularity in attendance struck the visitors as remarkable. For the past three months the daily average attendance at the Kinsman school, which is in that respect typical, was 91 per cent. of the number of pupils enrolled. More striking in this connection is the fact that the percentage of regular attendance among the youngest pupils—those of five, six, and seven years—was as high as that of any other class.

"The three lowest grades overtake the work ordinarily covered by the public schools in Ontario. The highest grade goes as far as our continuation class, Grade A, being competent to accomplish about three years of the high-school work."

The large classes and larger schools seemed to meet the social needs of the children better than the small isolated schools. The older boys and girls, grown into young men and women, had opportunities for going on with a high school education without going away from home. There was said to be, and there appeared to be, a great development of a spirit of co-operation and of mutual goodwill and friendship from the wider and closer acquaintance of the children of the locality, and from the new interests created and recognized as being common to all, and for the common good.

EXTENT OF CONSOLIDATION IN UNITED STATES.

The system of consolidation of rural schools has been introduced to a greater or less extent into seventeen states. The object appears to have been to secure a more regular and larger attendance of the children, and in some cases to reduce the cost of education. So far as reported upon, the cost under consolidation with the free conveyance of the children has been less than formerly (under the old system of one-room school sections) in 70 per cent. of the cases considered, the same in 18 per cent., and more in 12 per cent. Wherever consolidation has been adopted, the people have not gone back to the old isolated section plan. The boys and girls in rural districts receive a high school education without going from home. On one occasion I paid a visit to the great library of Congress at Washington. It cost a fabulous sum to build. It makes one think of the description of the New Jerusalem with its wealth of color, its superb massiveness, its beauty and grandeur; but in my opinion

the consolidated schools I saw in rural parts of Ohio and Iowa were a greater tribute and credit to the enlightenment and advancement and high civilization of the people of the United States than the splendor and magnificence of the home of books at the Capitol. Through the consolidated schools the children of the common people are being led into paths of intelligence, ability and usefulness. Nothing paves the way to those acquirements like making smooth the path of little feet to come dry to school, and to come willingly every day. Why cannot we have them in Canada also? My generous friend, that prince among men in spirit and in purse, Sir William C. Macdonald, is willing to help with his wealth, the Departments of Education everywhere approve, and the people themselves want them as soon as they perceive what they could do for the education of their children.

COURSE OF STUDY.

In the rural schools, under the present system of isolation, with lack of time, lack of qualified teachers, and lack of equipment, little has been done to provide Nature Study, Manual Training, or training in Domestic Economy; but under the system of consolidated rural schools much could be accomplished.

It is the duty and privilege of the teachers to guide and train the pupils to apply their new knowledge (very little it may be), from day to day, to the doing of something which the pupils know to be useful and beautiful. The so-called practical work is what makes the other work, with the books and symbols, vital to the children, and so ministers to the growth of the one-and-indivisible in their bodies, minds and spirits.

All work in the course should be arranged in such a manner that the difficulties of each part of it may be presented, graduated to suit the ever growing capacity, intelligence and strength of the learners. Thus progress would be indicated and measured, not so much by quickness of perception and a good memory for names, facts and rules, as by habits of thoroughness, truthfulness, accuracy and self-reliance.

All this would not imply that the school course, or curriculum, should be burdened with more studies or subjects. On the contrary, by getting rid of some of the formal informational studies from books, in so far as they have been separated from the activities and curiosities natural to children, and judiciously correlating all subjects with practical work, there would be a fair chance for ordinary children to get a really helpful education. All subjects of the school course would have a definite meaning, and real value to the children when taught and studied in constant relation to what they

knew and understood to be the real in their own lives, their doings and their surroundings. I wish there were a shorter, simpler word than "environment," and then I would use it in saying that such a course of study would lead to ability in overcoming obstacles and in controlling self and environment.

THE READJUSTMENTS.

To what essential part or parts of the present course of study should any new subjects or new methods be adjusted? The notion has been spread by the catchy sounds of "the three R's (reading, 'riting, and 'rithmetic") that these are still the most important parts of an elementary school course. That has done our schools and children much harm. Most errors are done up in catchy or sonorous phrases.

Nature Study should be central, with Manual Training and Domestic Economy on either side of it. These provide for the "three H's in education,"—the training of the Head, the Hands and the Heart into intelligence, ability and unselfish service. These three, Nature Study, Manual Training, and Domestic Economy, are not fads in any sense. They are fundamental to the maintenance of civilization and the upward progress of the individual and the race. We are part of Nature; life itself is sustained by natural processes; therefore, a study of Nature is necessary. We are the tool-using, weapon-using, instrument-using creatures on earth, and Manual Training makes for mental power through those agencies. We seek to make comfortable, happy homes, and science and art in Domestic Economy enlarge our ability to gain and enjoy that chiefest earthly goal.

NATURE STUDY.

In a recent address in London, Sir George Kekewich, Secretary of the English Education Department, is reported as having said: "The study of Nature is the essence of all true education, and it is somewhat remarkable and not perhaps creditable to our common-sense that we should have failed to fully realize it until the twentieth century."

In the English schools, Nature Study goes under the name of "Object Lessons on Science" or "General Elementary Science." I hope, however, that it will not be mistaken, in the rural schools of Canada, for the study of elementary science as classified into textbooks on Botany, Geology, Physics, Biology or Hygiene.

Nature study is not for the purpose of acquiring information about soils, plants, animals and inorganic things; it is rather a

means of training the personal power of the pupil into a condition of symmetry and maturity, through a knowledge of and sympathy with those things acquired by doing something with them.

Nature study would not crowd out any essential branch of learning from the common schools, but, on the other hand, it would stimulate an interest in all subjects as the pupil discovered their relationships to his daily life and the world about him. The improvement in the school course is to be made not so much by a change of curriculum as by a change in the methods of treating the various subjects. For instance, let a pupil plant ten grains of wheat in a row, ten grains of Indian corn in another row, ten seeds of potatoes in another row, and ten seeds of clover in another row. Let him pull up one plant of each row every week and find out for himself, under the guidance of a competent teacher, what had happened in the meantime. Further, as far as he was able, let him make drawings of the plot of ground and of the plants, and a written statement of the progress and growth, as he was able to observe it, from week to week. If then his lessons in reading and in arithmetic should have a direct bearing upon this nature study work, would not such a course give an intelligent boy or girl a great amount of exceedingly valuable education?

Instances might be multiplied, sufficient to fill the time-table for the whole of the school year. A little reflection would bring these to the mind of every teacher of experience.

Nature Study lessons should follow the seasons of the year. The out-of-doors part of them is not the least valuable. Only in advanced work do chemical or physical apparatus become necessary. A circular issued by the English Board of Education in April, 1900, has the following recommendation: "The teacher should, as occasion offers, take the children out of doors for school walks at the various seasons of the year, and give simple lessons on the spot about animals in the fields and farmyards, about plowing and sowing, about fruit trees and forest trees, about birds, insects and flowers, and other objects of interest. The lessons thus learnt out of doors can be afterwards carried forward in the school-room by reading, composition, pictures and drawing."

Outlines of courses which have been prepared in a provisional way by the Canadian teachers in training under the Macdonald Rural Schools Fund are illustrative of what might be undertaken. Their scheme provides for eight grades; from the primary to the eighth grade, which is just below the High School entrance, or equal to Senior Form IV. in the Public Schools of Ontario. I cite only the outline of courses suggested for Grades I. and VIII.

"Grade I. Planting and caring for a small garden plot; watch-

ing the growth of plants; noting the seasonal changes in the landscape, and in plants and animals; observing the habits of common animals; examining the obvious effects of rain on soils, and on plant and animal life. Field trips and excursions."

"Grade VIII. School-garden work extended; fuller interpretation of natural phenomena; previous studies in animal life reviewed and extended; study of individual plants, particularly weeds and cultivated plants, with special reference to their adaptations in form, structure, etc., to their surroundings; simple studies in the lower forms of plant life; lessons on the food and growth of plants, and simple, physical and chemical experiments necessary to their explanation; lessons on the composition of the air and water, and their relations to plant and animal life; aspect of the heavens at different seasons."

Time will not permit me to go more extensively into detail in this matter. A bare mention of a few other subjects which might be dealt with in their proper order must suffice. I offer them only as instances of what might be taken up usefully; but I have not tried to arrange them in any graded sequence for educational purposes. Common things, such as pumps, pendulums, thermometers; properties of foods, materials for clothing, for houses and furniture; ice and other crystals; sounds, noise, music; light, microscopes, telescopes, photographs, eyes.

READING.

A well-known educator has said, "One of the best possible reading lessons for beginners is reading something of which they have already thought out the meaning."

WRITING AND SPELLING.

Intelligent purpose put beneath those exercises, by the children themselves, would help them to make progress. One can readily understand how a composition exercise describing a plot of ground, the appearance of a plant, the behavior of an animal, or some other thing which had been observed and studied as part of the school course, would be far better written than one which had been produced mainly by ability to remember words or phrases, or thoughts which had been read or heard from a book. A composition regarding an excursion to the woods would not be too difficult for the youngest child who could read and write, and would give enough scope for the most advanced pupil.

The greater part of the course in geography, excepting that which is political and mathematical, might be taught as a branch

of nature-study. Geography would begin with the home and the schoolhouse ; would pass out to include the roads, railroads, streams and hills of the locality ; would soon take in the township ; then the county, in a more general and less detailed way ; then the Province ; then the Dominion ; then the Empire, and then the world. The training in observation, recognition, investigation and understanding, properly co-ordinated with reading, writing, figuring, and geography, would go on without the children being expected to recite the height of the Himalayas, the length of the Mississippi, the width of the Amazon, or the position of the great maelstrom off the coast of Scandinavia.

Such studies as these would lead up to and out to the study of history. The study might be taken up with the history of the locality as a starting point ; or, better still, might be centered around the personality of some well-known character.

Taught in this common-sense, lovable way, reading, writing, arithmetic, and even spelling, as well as geography and history, would become a delight to the so-called dull boys and girls at school. In fact, dullness on the part of the children is too often but a symptom of an ill-arranged course of education and not of weak mental faculties in the classes.

MANUAL TRAINING.

All that has been said in regard to method and purpose in Nature Study would apply to the Manual Training and Domestic Economy divisions. In Educational Manual Training the advance has been one from books to benches and tools—from the passive and receptive attitude to the active and constructive movements—as a means of mental culture. In rural schools the advance should be widened to become one from books to benches and tools ; and from both to plots of ground and various objects, animate and inanimate, also as a means of mental culture.

There is a special virtue in Manual Training, in so far as it has a unique power, as a school subject, of securing and sustaining interest. It puts the active, constructive expression by the pupils in place of the heretofore receptive and passive attitude which has been expected from them.

The courses in Manual Training are various. They may be in clay modelling, or in cardboard, before woodwork ; then in woodwork and sewing ; and, by and by, in Domestic Economy as an educational subject. The latter is not for the sake of making cooks any more than the former is for making carpenters. I am just as averse, from my standpoint, to teaching cooking in elementary

schools as I am to teaching carpentry. Manual Training is for the educational processes and their effect on the mind as well as the body.

DOMESTIC ECONOMY.

From a course in sewing, properly graduated as an educational process, girls may derive quite as much mental advantage as boys obtain from a course in educational woodwork. The qualities of precision, patience and industry come from it, and it further cultivates good taste, a love of the beautiful, and also of appropriateness in dress.

Similar benefits would result from properly graded courses of study and practice in the divisions of foods, and housekeeping.

TOWARDS AGRICULTURE.

"Nature Study is not to be confounded with systematic teaching of agriculture; it is, in fact, a very different thing. It deals, however, with elementary facts and principles, on which the study of agriculture should be based, and is, therefore, in a large measure, a preparation for the study in later years."

In that sense it does for agriculture what manual training does for technical and industrial education, as applied to manufacturing occupations. It gives a wide basis of general intelligence and skill from which to specialize towards a particular industry. From the article by Dr. Fletcher, which has been referred to already, I take the following, which is just to the point in this connection:

"Not only is nature study useful in training and strengthening the mind to act for itself, but, more than any other part of the framework which supports the educational edifice, it becomes a permanent support of the completed structure. The uses of this knowledge are so manifest that nature study must take its place as the common-sense method of education; and it is at the same time the common-sense basis of the two great and most important occupations of the masses—agriculture and horticulture—these pursuits, having to deal with the care and nutrition of plants and animals, are founded on subjects all of which come within the limits of natural science, a preliminary knowledge of which is nature study."

GOOD LITERATURE.

As far as practicable, all training in observation, investigation, understanding and recording, would include lessons in reading, writing and arithmetic. The exercises written regarding what had been examined, recognized and understood, would become language

lessons of a really valuable sort; lessons in growth of thought; lessons in expression of thought; lessons in arrangement of thought; lessons in clearness, brevity, and fullness; lessons in correctness and beauty of sentences.

Such studies would also lead to the love of good literature. A child trained to close observation, quick recognition and intelligent understanding of the things that lie about him, would be ready to relish and appreciate good literature. He would catch the meaning of the author, the beauty of the expression, the uplift of sentiment, as no one could who had not behind his reading or listening as much experience or feeling, perception and imagination, as the well-trained child. With nature study, a school library and a competent teacher, the entire field of necessary or desirable work could be covered. The child would be exalted into the proper place; and, perhaps, formal text books and set examinations might be dethroned. They have usurped long enough.

CO-ORDINATION AND GRADATION.

What is needed most is the help of experienced teachers who know the true educational plan to put below such work and study by the children. The whole purpose below this newer method should be to train the faculties of the children in natural ways, and to make the objects, the exercises and the information acquired, directly serviceable to that end.

The course of study should be graded—graded in such order that the children would be ready to take up each part of it with a consciousness of being equal to it. It should be systematized so that the pupil's progress would be evident even to himself. It should be put in such order that every year of study would count, in itself, for so much of real gain to the child in ability to think clearly, to know exactly, and to overcome obstacles.

The least measure of all these studies would, as far as they go, be of real benefit to all the pupils during their school years and afterwards. If a child attends school for only one, two or three years, the schooling of these years should be of lasting benefit to him in developing intelligence, personal ability and love of working with others to attain some end for the good of all.

THE PROSPECT FOR CANADA.

We hope to see not less than one thousand consolidated rural schools in Canada—with Nature Study, Manual Training, and Domestic Economy, in less than ten years. Already in Carleton County, near Ottawa, the trustees of a small school section have

purchased two acres of land, and propose to build a consolidated school without outside help. The inspector of schools for the county has provisionally indicated some twenty centres where consolidation could be effected in the county. It is in the hearts of the people to give the children in rural districts a good chance when they see how they can do it.

We must not consider school questions from the standpoint of expense alone. No great advance in agriculture is possible except by education; and no material permanent improvement in education in rural schools appears possible except through consolidation. The two are inseparably linked together. Agriculture needs better schools, and better rural schools can be obtained by consolidation. There are obstacles and difficulties in sight, but the end to be gained is greater than any hindrances that loom up in the way.

THE MACDONALD RURAL SCHOOLS FUND.

The plan whereby it is proposed to afford some financial aid and object lessons of improvement of rural schools contains three parts directly applicable to Nova Scotia.

Part 1 of the Plan is intended to give object lessons of improvements in education from the consolidation of five, six or more small rural schools into one central graded school, with a School Garden and Manual Training and Domestic Economy rooms as part of its equipment.

It is proposed to offer financial assistance to one locality in Ontario and one locality in each of the Provinces of Quebec, New Brunswick, Nova Scotia and Prince Edward Island, to induce the people to undertake and carry on object lessons of improvements in education with School Gardens, Manual Training, and Domestic Economy, all under the control of the regularly-constituted educational authorities.

In Nova Scotia, Middleton has been chosen as the location of the Macdonald Consolidated Rural School. The school will be built and equipped from the Fund. Any cost for maintenance above the total cost of maintaining the little rural schools before consolidation, will be met from the Fund for a period of three years. I may say without any reservation that I think the consolidated school at Middleton, and the four similar ones in the other provinces, will be the five best rural schools in the world.

GROUPS OF RURAL SCHOOLS WITH A TRAVELLING INSTRUCTOR FOR EACH GROUP.

Part 2 of the plan is for the purpose of giving object lessons of the value of School Gardens and Nature Studies, at individual rural schools, as a part of general education, to be begun by means of a travelling instructor, who would visit and spend one-half day per week with the children and teacher at each school of a group, for a term of three years, or until a considerable number of suitably trained and qualified teachers would be available to carry on such work themselves at rural schools.

It is proposed to offer financial assistance to one group of five schools in one locality in Ontario, and to one group in each of the provinces of Quebec, New Brunswick, Nova Scotia and Prince Edward Island, to enable the people to provide School Gardens, and to undertake and carry on object lessons and experiments with improvements in education, all under the control of the regularly-constituted educational authorities.

A group of five rural schools in the district around Truro, N. S., has been chosen in which to give an object lesson or illustration of this better education. A competent travelling instructor, engaged to spend half a day of every week at each of these schools, will be able to train teachers and children into methods of Nature Study. The travelling instructor will be a specialist in Nature Study and Nature Knowledge, as well as a good teacher in the subjects which have been common in the schools in the past.

It would certainly be of great benefit to the children at any rural school, if a School Garden containing plots for every child above the age of eight or nine years could be provided. Those plots would be used (like slates of large size), to put "things" on, to be rubbed off when they had served their educational purpose. The gardens could be used, as they are at a few schools in England, and as they are at many schools on the continent of Europe, for the training of children to habits of close observation, of thoughtfulness, and of carefulness.

If one may mention a method which would seem to include the best, it would be that of tracing results back to their causes until that habit of mind is formed in the children. When a child does anything with its own hands, such as planting a seed, pulling up a plant, making examination of the changes which have taken place during its growth, making a drawing of it, mounting it and putting its name on it, he receives impressions by the sense of touch; he sees, he hears the noise of the movements he makes, and he smells the soil and the part of the plant with which he is dealing. Those

impressions are definite and lasting; they add to the sum of sensuous knowledge; they prepare for the perception of logical knowledge, in a common sense way.

Progress in agricultural education would be made by starting Evening Continuation Classes in the rural districts in connection with those groups of schools, or in connection with the consolidated schools. These would provide the true solution for education in agriculture and horticulture of youths in the country at the ages from fourteen to eighteen. One or two central schools of each of these groups might be chosen for Evening Continuation Classes. At these, what the young lad, working on the farm, saw during the day with his uninstructed eye, could be explained to him in such a way as to awaken a new interest in his work, and greatly increase his ability for enjoying it and carrying it on well.

Two teachers of approved ability from Nova Scotia have been chosen to join a class made up of similar teachers from the four other provinces. The class of picked Canadian teachers was sent to the University of Chicago and Cornell University for short courses in Nature Study and methods in education. They are now taking a further course at Teachers' College of Columbia University, New York. These men are to carry on the Object Lessons until other teachers now in the service become qualified and until teachers-in-training in the several provinces are ready for the new and better sort of schools.

SPECIAL COURSES OF INSTRUCTION AND TRAINING FOR TEACHERS OF RURAL SCHOOLS.

Part 3 of the Plan has for its object to assist in providing short courses of instruction and training for teachers for rural schools, who desire to qualify themselves in these newer subjects and methods of education.

The sum of \$175,000 has been donated to the Province of Ontario to provide at the Ontario Agricultural College at Guelph, a building, including a Nature Study plant-growing house, and such an equipment as may be required, in addition to what is there at present, for the accommodation of teachers while taking short courses in Nature Study for rural schools.

To make possible such additions and changes in rural schools as have been indicated, and to let them be capable of anything like general adoption and extension, there is need for further preparation of the teachers now in the service. No doubt teachers in Canada would be willing to qualify themselves for this better sort of work if an opportunity were provided. It seems desirable and practicable to give such teachers the opportunity which they need.

At several places in England in 1901, short courses of instruction and training-in methods were provided for periods of only three weeks, with the expectation of doing a good deal towards qualifying teachers to carry on their work in a better way.

Provision will be made for a class of about thirty or forty teachers at each short course, and it is hoped that the government of each province concerned will arrange (by scholarships providing substitutes or otherwise) to enable approved teachers in rural schools to take the short courses without loss of situation or loss of salary.

For a period of three years, at least fifteen teachers of rural schools outside the Province of Ontario are to be eligible to receive instruction and training in the short course at Guelph without any fees.

For the first year, it is proposed to make, (1) an allowance at the rate of five cents per mile for the actual distance from the teacher's school to the Ontario Agricultural College, to help in meeting travelling expenses, and (2) an allowance of \$25.00, to help in meeting the expenses of board and lodging, to every approved teacher who has taken a full course satisfactorily.

DOMESTIC ECONOMY OR HOUSEHOLD SCIENCE.

Part 4 of the Plan is intended to assist in providing courses of instruction and training in Domestic Economy or Household Science for young women from country homes, in order that they may have opportunities for acquiring practical and advanced education not less suitable and helpful to them, than the present courses at the Ontario Agricultural College are beneficial to young men, who take them with earnestness and cheerfulness.

Out of the sum of \$175,000 already mentioned as a donation to the Province of Ontario, there will be built at the Ontario Agricultural College at Guelph, (1) a residence to accommodate not less than 100 female students and teacher-students, daughters of farmers and others, and (2) class rooms, kitchen laboratories and other equipment necessary for courses of instruction and training in Domestic Economy or Household Science.

Suitable courses (long and short) which would include instruction and training in dairying, poultry-keeping, bee-keeping, fruit-growing and general gardening, with particular attention to the cultivation of vegetables and flowers, would be highly valuable to the young women who were able to take them, and through their influence would be of far-reaching benefit to the rural schools and the rural population generally.

Special regard might be given to properly arranged lessons and exercises,—

(1) In the selection, preparation and serving of foods in the most nourishing, wholesome, appetising and economical manner ;

(2) In sewing, dressmaking, and the simpler forms of household art and decoration ; and

(3) In the care and cleansing of rooms, fabrics, sinks, etc.

All to the end that the pupils might know the relation of those things to health and comfort, and might observe those methods and practices which make for good-living in simple, clean, well-kept and beautiful homes in the country. Such in outline is the plan which Sir William C. Macdonald offers to assist in putting into effect for the purpose of helping on the improvement of education at rural schools in Canada.

THE OPPORTUNITY OF THE GOVERNMENT.

How can the advantages of such improvements in rural schools be made permanent in this province? How can you provide teachers for these consolidated rural schools with their course of study and methods adapted to life in rural districts? By a system of education that will produce teachers capable of training children in this way. There is no spectacular politics in helping the common rural schools. There is no theatricals in getting down to fundamental principles and means to help the boys and girls in the country who are little heard of, but who need the action of the government and of the legislature to enjoy a fair chance. There is constructive statesmanship in such a policy. It is not the work of building with wood, hay and stubble; it is building with gold, silver and precious stones; it is building up fine character in human lives; it is work that is worth doing well. The government is the intelligence of the people organized for their protection against outside enemies, and against inside foes like ignorance, disease and crime. That is what responsible governments are supposed to exist for; and a pressing duty is to take hold of this problem of education for the benefit of the rural communities, and organize it. It deals with two things that concern the progress and the safety of the people. First, with the personality, with the personal power, of the common man, and, second, with his chance in life. Personal power is added to only by education. That is the only means of improving what the Almighty gave anyone in natural endowment. The ordinary child needs that as much as the child of rare mental powers; nay, perhaps needs it more. Then we take it that governments are to

some extent concerned with the individuality and also the opportunity of the governed. What is meant by opportunity? The right of individuals to liberty and to hold property; facilities for safe communication; for travel; for transportation of goods; security of opportunity for earning a living and obtaining a fair share of happiness and possessions. These are in rough comprised in opportunity as controlled by governments. The post office, the railways, the common roads, the bridges, are fundamental to equity in opportunity and need not be discussed here. I want your attention continued on the subject of the personal power, the ability of the child. It is always with us and always needing improvement, enlargement, nourishment, by education. It needs it on the farm as much or more than in cities, where men most do congregate.

WHO ARE READY FOR INSTRUCTION.

One means by which we can know who most immediately need education in agriculture and what sort of education they need, is to discover what the people on farms are producing. The agricultural values of products from the farms of Nova Scotia in 1900 amounted to \$16,305,555. That was made up as follows:—

From Field Crops	\$8,584,956
Dairy Products.....	2,885,997
Live Stock sold.....	1,427,777
Meat Products (not including Poultry)..	1,169,301
Wool	187,097
Poultry and Eggs.....	621,165
Apples (about)	600,000
Other Fruits and all Vegetables.....	807,369
All other Products.....	21,893
	<hr/>
	\$16,305,555

If you put the revenue from all the farms of the province into an illustration sum and call it \$6, then \$3 of that amount came from field crops, more than \$1 from dairy products, more than \$1 from live stock sold, meat products and wool, and less than \$1 from all the rest put together. These represent the interests of the various branches of agriculture at present; and in the enlargement of production and the extension of markets it is more than probable they may continue for a good while in the same relative order. I am disposed to say that the apple business of the province has a precarious future before it—an exceedingly precarious future. Look at the small crop of Nova Scotia in 1902 and at the low prices that have prevailed over the world. The apple is not one of the great articles for human sustenance like bread, meats, butter and eggs. I hope that the orchards will yield fair crops and find remunerative

sales in future; but when I hear any one say, "Let every one go into apple culture," I have a feeling of caution. There is a sure sale for the ordinary farm crops, grains, animals, and animal products, because the number of people who will consume them are increasing every day.

SOME COLLEGES OF AGRICULTURE.

How can we help the personal power of the people who produce these things? How do governments and powers that control education in other countries help them? There are colleges of agriculture in England. I went to one of them that was over 50 years old. It was established for the purpose of giving an education to men who were to become factors of large estates and agents of land owners. It has done hardly anything else than that ever since it was started. It has done that well. That is the Royal Agricultural College of England. It has gone on educating the kind of men that England needed for particular work. Of the continental colleges of agriculture the same thing is true in many cases, except in the case of France. In France the agricultural schools and colleges train many teachers who become instructors for the rural schools; and in France, as I have mentioned, they have doubled the yield of crops per acre. There is not a part of that country where an instructor in agriculture does not visit the rural schools. They have school gardens and illustration plots and experiments. The French people are not as intelligent as our people; but this shows all the more clearly what a definite system will do. The colleges of agriculture in the United States for a long time turned out chiefly men who followed some professional life, became instructors in other colleges or writers. They did good work in this direction. In late years, by their short courses for practical farmers, they have multiplied their usefulness in every direction. The agricultural college at Guelph, Ontario, is a splendid institution; but it lingered along in a way that was most unsatisfactory to the people of the province, down to about 1884. I can remember when the number of students in attendance was growing less and less and the people were dissatisfied with the college as a whole. Then the college sent its professors out to get in touch with the people through the Farmers' Institutes. The first year I was a member of the staff of the college, I gave more than one-half of my time to attending farmers' meetings. I frankly confess that I learned more from what the farmers said, than they did from what I said. A man with open mind cannot go to sixty farmers' meetings and listen to discussions and answer questions, and hear of the best methods of doing things, without getting a college education in agriculture of a superb sort. I got one that way. I got at those meetings a special course such as I could not have got elsewhere. I passed on what I got of value at one meeting to the next meeting. Afterwards, in holiday time,

the people of Wisconsin gave me \$200 and expenses for addressing meetings in that state. While going about addressing meetings in Wisconsin I saw every silo I came near. I learnt all I could from the practical men who had been successful. When I returned I got one built at the college at Guelph and proclaimed Indian corn and ensilage all over the province. This was simply putting into practice what I had learnt and seen done. I got close to men who had met difficulties and had overcome them. Then the college at Guelph began to take on a new aspect. The rest of the college staff did the same thing. We all went to farmers' meetings. Then the government of Ontario said to every county council in the province that they might nominate one student to the college at Guelph, free of charge as to fees. The county councils offered the scholarships to those who desired to obtain them; and I have known men coming from the towns and cities on the scholarships offered by the county councils. Then the college commenced to give short courses on various subjects to men and women actually engaged in some branch of farm work. Now three times as many students attend the college taking the short courses as those who are taking the long course. The agricultural college at Guelph is a superb institution and is doing splendid work. It just needed the help that Sir William Macdonald has given it to bring it into touch with the common rural schools. Since that has been accomplished I think it one of the finest and best institutions of the sort in the world. It has cost, including the Macdonald buildings, over \$500,000 in capital expended; and it costs about \$60,000 a year to keep it up. I spent four happy years there and I got more good than I gave. At the same time I did not leave in debt to it after all.

THE COLLEGE FOR NOVA SCOTIA.

The sort of college of agriculture which you need in Nova Scotia must be determined by what it has to do. Take, for example, the Royal Agricultural College of England, a college with a long course, which turns out nothing but land agents, grieves and factors. We have no use for such people in this country. The Royal College of Denmark is a college of another sort, and one of the most successful and prosperous in Europe. It has only ten acres of land and does not want more. It has a record of over 75 years behind it. You have to determine what sort of a college you want by discovering and deciding what it is to do. I have heard more vigorous contention and more vehemence of adjective used in discussions as to where the college is to go, than as to what the college is to do. There seems to be on the surface a struggle as to where this unknowable and visionary thing is to be located, more than a sifting by discussion of what it is to be and do when you get it. I confess that the name of the place at which it may be located does not concern me. My first concern is,—What is the college to attempt

to do? The answer to that determines its form. There can be no progress otherwise. It would appear that if a college of agriculture is to be established here, it should help the people who produce half of the revenue from the land, the men who raise the field crops. Then it should help the dairymen and the live stock people, the fruit people, the poultry people and the vegetable people, that being the order of their importance in this province.

SHORT COURSES.

Suppose that you had a short course on the cultivation of soils, lasting for ten days, with a fine instructor who could tell the pupils and lead them to learn more than I have even hinted at; and suppose you paid such a lecturer two hundred dollars for the short course, that would be a cheap course of lectures. Suppose a man of eminent ability and reputation were engaged for such a course of lectures, giving instruction of the very best character on the meaning of different soils, their cultivation and their improvement, I warrant that you would have an attendance of 200 at the first course, if it were properly advertised. Let that be followed by a short course on the improvement of seeds. I witnessed part of a course of lectures and training at the University of Illinois, where the class spent a period in the afternoons for two weeks in judging seed corn. Suppose an expert of unusual talent and experience came here and gave a course on the subject of seed grains, including the management of crops. I think many of the men who attended a ten day course on the improvement of soils would be willing to remain for ten days more for the course on seed grains. Then you could have short courses on dairying, short courses on fruit culture, short courses on poultry keeping, all to help the practical men. A man who takes such a course one year will want his boy to take it next year; and so the short courses would meet an existing need amongst farmers and ensure attendance of the best class of pupils from the farms. It may be said that you might have such instruction as these courses supply without a college of agriculture. I do not see how you could have them with the largest measure of service to agriculture and the farmers, without an organized college staff. Again, a college of agriculture is required to supplement the work of the normal school in training the teachers who are to take charge of the consolidated rural schools. These short courses would be useful to them at first, and could be improved into something better organized and arranged after the first year.

LEADERS IN AGRICULTURE.

Then the Farmers' Institutes should be in close connection with the college of agriculture. Every Farmers' Institute worker should have taken one or more of the short courses, not merely to be able to

say something really good, but in order to say it in the most effective way. Suppose the province had a number of men trained for that, don't you think they could make addresses of a half hour each on the best methods of cultivation and other subjects full of valuable information for their neighbors? In this way you would make available the teaching talent of the best practical farmers in the province. Let one man from the college staff go with two of your local men to each of those Institute meetings and address the people. That is the means whereby the best knowledge of the best would become the common property of all in the locality. Furthermore, there is need for a regular course of three or four years in agriculture, leading to a degree. I have spoken of personal power being gained by education. That may be augmented in the case of any individual by the control of wealth and other forces. In that sense the great resources that you have in Nova Scotia reinforce and increase the provincial power, which is the aggregate of the power of the individuals. And believe me, the quality and effectiveness of that power may be added to in geometric ratio by the quality and ability of leaders. No nation has ever attained greatness in any direction that had not its own leaders. Every people will follow leaders born into sympathy with their aspirations and trained into ability to meet the new conditions of every new advancement. Let your leaders for the new conditions in agriculture, for the new needs in education, be trained in your own college, and they will mightily help the common people. You can commence this year with your short courses; and the young men who intend to take a four year course could not get a first year in college of better opportunity and work, than by taking all the short courses in sequence. I think every college student would profit by beginning his college course in a similar way.

THE ORGANIZATION.

Six departments could carry on the work of a college that would be a credit to this province. These departments would be: (1) A department of Agriculture and Live Stock. That stands first in my judgment because it is the most important interest of the rural people. (2) A department of Nature Study. (3) A department of Horticulture. (4) A department of Agricultural Chemistry and Physics. (5) A department of English and Mathematics. (6) A department of Institutes, Illustration and Research work and Farming. There are your six departments. Research work and illustration work is very valuable and should not be dropped, but that should not control the character of a college of Agriculture which does its class-room work when the farm is frozen up. The boys and men can be spared to go to college when they cannot work on the farm. A farm is not a necessary part of a college. You could begin here in a very modest way; and the modest way

means first of all, with efficiency. I would begin by utilizing what you have now as far as possible; by organizing what you have now so as to get the best possible results out of it. You have a department of Nature Study in connection with the Normal School. You have a department of Horticulture in this province with a professor at the head of it. You have a department of Agricultural Chemistry and Physics at the Normal School, with a graduate of Cornell University at its head. You have departments of English and Mathematics in connection with the Normal School. So that all you need more to make a well equipped college is a department of Agriculture and Live Stock and a Superintendent of Illustration and Research Work. With these departments you could have a college of agriculture which would serve Nova Scotia as well at a cost of \$15,000 a year as the Agricultural College at Guelph now serves the province of Ontario at a cost of \$60,000 a year for maintenance. I estimate that by using what you have now in buildings, premises, equipment and men, your capital expenditure need not exceed \$25,000 to give you a service as good for Nova Scotia as Ontario gets from a capital expenditure of over \$500,000. Then by adding \$5,000, which should be a mere bagatelle to this people for education, in order to increase the size of your buildings, you would be able to provide accommodation, which is not costly, for students from the provinces of New Brunswick and Prince Edward Island. The staff of teachers would not cost any more, and if you could render that service to the neighboring provinces for the interest on \$5,000, is it not worth while to do it? A small charge for fees to their students might be made, and the revenue would meet the interest on the increased cost of \$5,000. Then you would be doing the fair thing by your own people and the generous thing by the people of the neighboring provinces.

Now if this Government or this Legislature will further appropriate the sum of \$30 000, or better still, \$2,000 per county, to help the people to build a few of the first consolidated rural schools in every county in the province, that will further help education for the improvement of agriculture, and you will have a scheme that will not only please the people but will help all the people.

By some such means the many factors and forces available for the improvement and advancement of education and agriculture in Nova Scotia could be organized for effective use. You will have a more generous sentiment in favor of education among the common people. You will have an enthusiasm for education, which must sustain the spirit and vitality of any system. As the people themselves perceive the benefit of it for themselves, they will enter upon a new era of real progress—progress that comes from the triumphs of intelligence, ability and co-operation. If this province will lead

the Maritime Provinces in the movement, it will confer a great boon upon the whole population. It will help them to carry on their work on farms with more profit, with greater happiness, and to be satisfied with life and its prospects in the Maritime Provinces. This is progress that is worth seeking. It will result in this province being peopled to the remotest places in its rural districts by men and women exercising their birthright of dominion by virtue of intelligent control of the forces and processes of nature patiently and with ever-growing pleasure and increasing power, lifting human life to higher levels of experience and aspiration.

Let us, each of us, in his place and according to his powers, join in helping on the victories of peaceful labor, the triumphs over ignorance and prejudice, the battles to be waged against want and disease, the campaigns for the diffusion of knowledge, the promotion of intelligence, and the advancement of good will and co-operation. These are the warfare accomplished which make a land stand forth enshrined in everlasting glory, a land of promise for little children, where the fear of God, and intelligent labour, restrain the greed and selfishness of the ignoble; a land of great men and gentle women, whose gentleness maketh the nation great.

It is now within the reach and power of this Legislature and Government to provide ways and means to bring all that and more to pass, for the benefit of Nova Scotia and the Maritime Provinces, and the Dominion of Canada; and there is nothing else in sight to this generation which promises so much of real lasting good for all the people.

